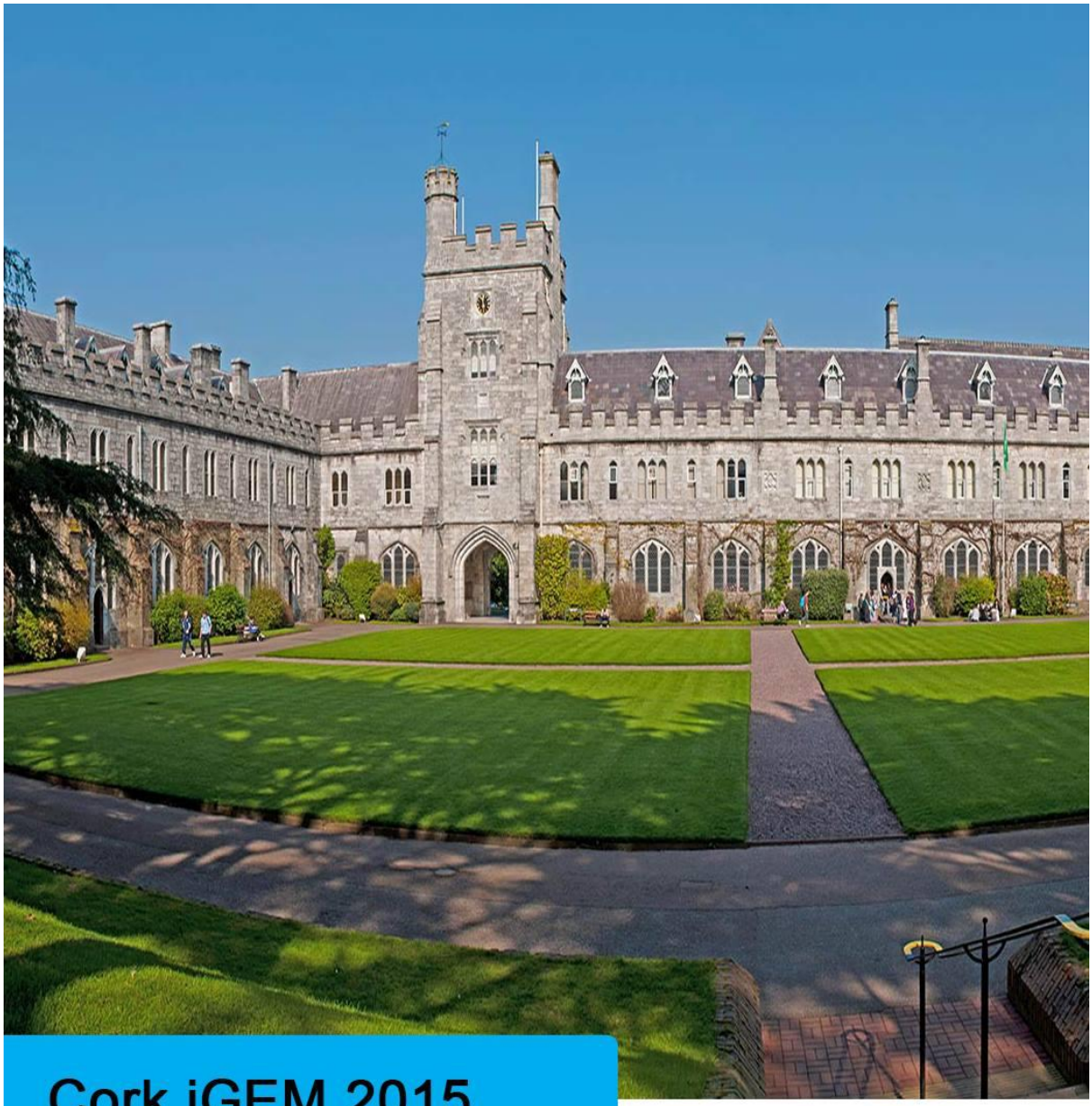


Cork iGEM 2015

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

iGEM

What is iGEM?

iGEM (International Genetically Engineered Machine) is a synthetic biology competition for third level students. The iGEM competition began in 2004 and has grown exponentially with over 260 participating universities from across the globe. iGEM involves teams of undergraduate and post graduate students undertaking research projects in the area of synthetic biology over the summer months.

The teams then present their work at the iGEM Jamboree and compete for prizes in a variety of categories. This year's iGEM Jamboree is being held in Boston at the Hynes Convention Center in September and is expected to attract more than 2500 participants. It is being billed as "the largest single event in the history of iGEM and synthetic biology", and this year UCC will re enter the competition for a second year in a row.

Our Project

We hope to advance the foundational work performed last year in developing a bacterial based diagnostics system. We hope to use bacteria to detect target sequences of DNA allowing for the cheap application of such technology in a wide variety of feilds including but not limited to; veterinary applications, cheaper alternatives for diagnostic tools for the Third World and possible uses in forensic tests.

Using genetically modified organisms to detect a specific sequence of DNA overcomes many obstacles in molecular biology. Firstly, no expensive equipment is required. With just a few reagents and the time it takes to grow cells overnight, a result can be achieved. This avoids costly machines and expensive chemicals required in current methods. In addition, no special training is required to carry out this test.

The most exciting feature of this system is its ability to be customised. Our DNA detector could easily be modified to detect virtually any DNA sequence, making it's applications in diagnosis endless

Information Sheet

Thank you for taking the time to answer this survey.

The aim of this survey is to determine the usefulness and potential of our novel diagnostic tool in Third World hospitals.

This survey is to be filled out by a lab technician or relevant person. If you would prefer to be anonymous for this study please write your preference on the reply sheet.

You are free to withdraw from our study at any time. We are grateful for your assistance.

If you are interested in taking part in this survey please return the reply sheet to whoever gave it to you while on their elective in with Surgeon Noonan.

If you have any concerns or queries, you can contact a researcher by emailing dosullivan373@gmail.com.

Thank you for taking the time to answer this questionnaire today.

Reply letter

I understand the above information. I consent voluntarily to participate in this research.

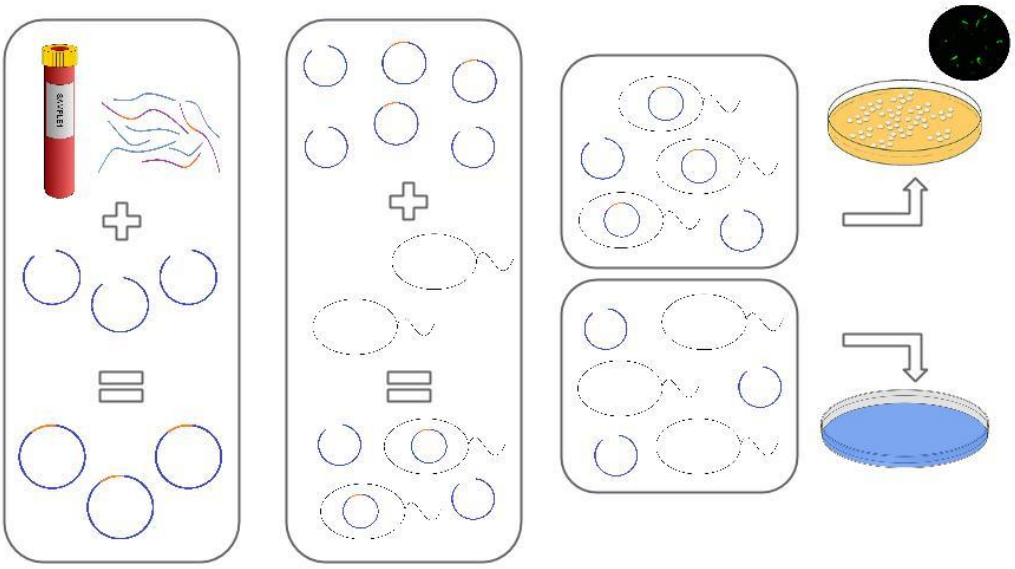
Print Name of Participant:_____

Signature of Participant: _____

Date: _____

Day/month/year

How does it work?



Our project involves the creation of a novel diagnostic tool that may be used to detect a specific short segment of DNA and give a readout. The system uses a unique detector plasmid that may be customised to target virtually any short sequence of DNA and will then transform E. coli cells only if the target sequence is present. When successful detection occurs, transformation occurs and growth of E. coli cells will only occur if the plasmid transforms. Hence, growth of modified cells indicates presence of the target DNA sequence. This system is simple, uses few reagents and requires limited equipment and expertise, making it a desirable alternative to assays such as PCR used to detect DNA sequences.

Potential applications:

This detection system may be used in a diagnostic setting to detect pathogenic organisms in patient samples, especially in resource poor labs where PCR facilities may not be available and rapidtest kits are not supplied. For example, the detection of malaria in a resource poor lab of the developing world.

The system may also have use in well-funded hospital labs where patient screening programmes have generated huge amounts of samples. A more costeffective screening method which avoids the use of expensive equipment and reagents may be beneficial in a busy lab. For example, the system could be used to screen cervical smears for HPV presence or also blood samples for HIV presence.

If the system is sensitive enough to quantify a DNA sequence present, it would have applications in a medical setting to assess viral load in patient samples.

The detection system may be used to diagnose genetic abnormalities. For example it could be used to identify carriers of a Cystic Fibrosis gene

Job title:

Hospital name:

What is your initial impression of this project?

What do you know about synthetic biology?

Do you have any concerns/worries about synthetic biology?

What is your opinion of using genetically modified E.coli in diagnostic tools?

Do you think that this diagnostic tool has the potential to be implemented in your hospital?

Would you like to use this diagnostic tool? (Please tick one box) *Yes* *No*

Do you think this diagnostic tool would be helpful, Why/why not?

What are the biggest barriers are problems? Please expand on potential problems, your feedback is greatly appreciated.

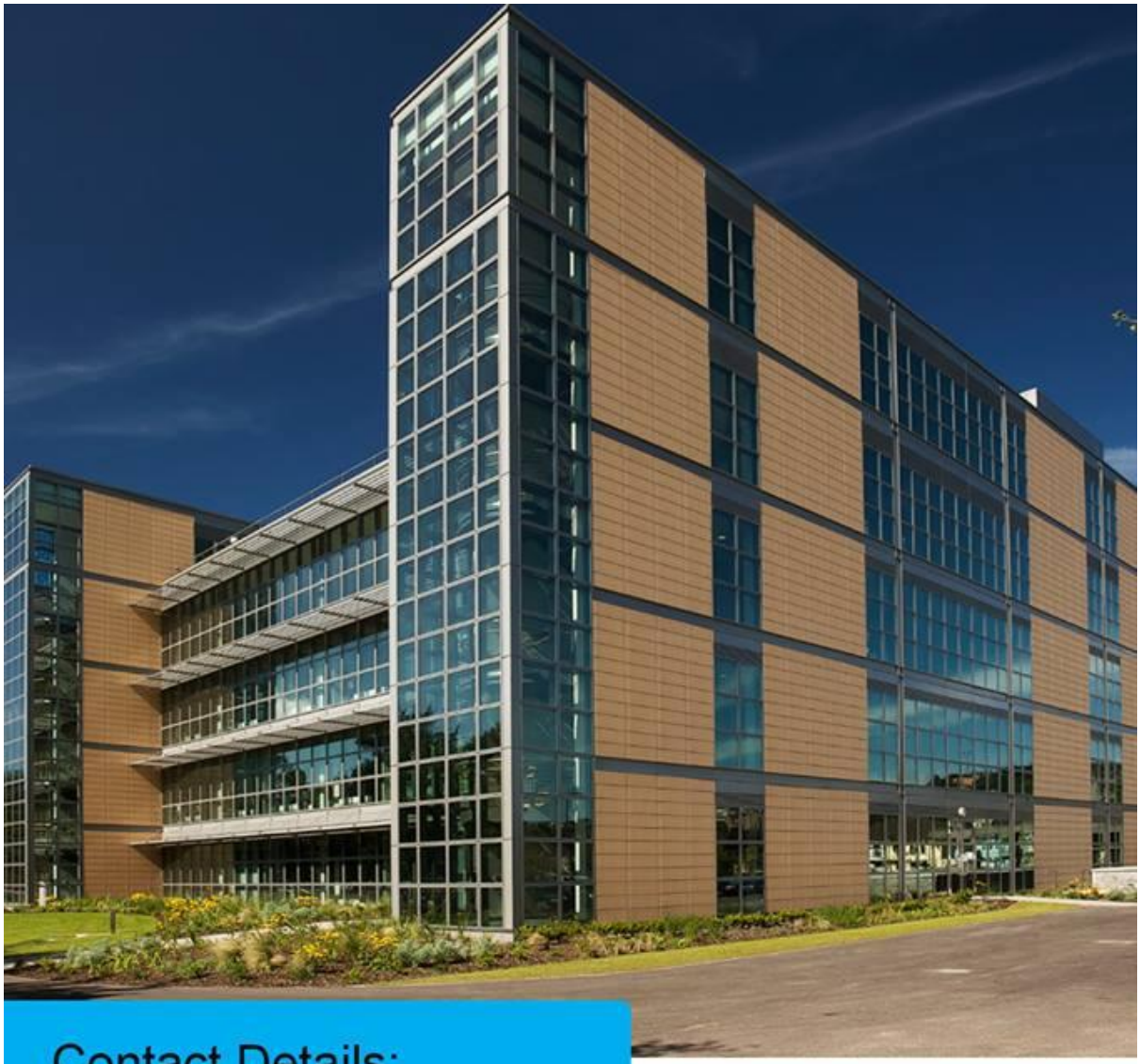
Is there anything that you think is good or that you like about this project?

What other diagnostic tools including assays and machinery are available to you in your lab? (PCR machine, urine dipstick, cell culture, centrifuge, anything?)

Please tick any of the following that you foresee as a potential problem to the implementation to this project:

- Lack of laboratory consumables ☐
- Lack of basic essential equipment ☐
- Limited numbers of skilled personnel ☐
- Lack of educators and training programs ☐
- Inadequate logistical support ☐
- De-emphasis of laboratory testing ☐
- Insufficient monitoring of test quality ☐
- Decentralization of laboratory facilities ☐
- No governmental standards for laboratory testing ☐
- Fresh water ☐
- Electricity ☐
- Dust ☐
- Protocol for test ☐
- Biosafety/security ☐

Are there any other problems that you think could affect this diagnostic tool? Or any comments you would like to make?



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